

Appl. No. 10/810,977
Amdt. dated July 21, 2006
Reply to Office Action of March 21, 2006

REMARKS/ARGUMENTS

Applicants' attorney thanks the Examiner for her comments and thoughtful analysis of the present application. Claims 22-36 are presented for the Examiner's consideration. Claims 28 and 34 have been amended to remove the term "aqueous" to make the claim clearer. Support for this amendment can be found on page 5, lines 7-8 of the present disclosure. Claims 1-21 and 37-39 have been canceled.

Pursuant to 37 C.F.R. § 1.111, reconsideration of the present application in view of the foregoing amendments and the following remarks is respectfully requested.

Applicants' attorney thanks Examiner Stephens for the courtesy of a telephone interview held on July 20, 2006. Her time and willingness to discuss the invention are very much appreciated. The interview included a discussion of Applicants' invention along with a prior art reference, U.S. Patent No. 3,989,596 to Bashaw et al. ("Bashaw"). During the interview, Applicants described the process for making the invention, the chemistry of the invention, and the product of Applicants' invention. Applicants then distinguished the teachings of Bashaw with regard to the process for making the invention, as well as the chemistry and resulting sorptive paper product of Bashaw. The Examiner requested that Applicants provide a written explanation for her consideration.

By way of the Office Action mailed March 21 2006, the Examiner rejected claims 22-26, 27, 29-32, 34 and 35 under 35 U.S.C. § 102 as allegedly being anticipated by U.S. Patent No. 3,989,596 to Bashaw et al. ("Bashaw"), or alternatively under 35 U.S.C. § 103 as allegedly being obvious to one of ordinary skill in the art at the time the invention was made, and thus unpatentable over Bashaw in view of U.S. Patent No. 5,494,611 to Howe. This rejection is respectfully traversed to the extent that it may apply to the presently presented claims.

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In accordance with MPEP § 2131, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. In addition, in accordance with MPEP §2112, to establish inherency, the prior art "must make clear that the missing descriptive matter is *necessarily* present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (emphasis added). The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

The invention of Bashaw is directed to a sorptive *paper product*. Bashaw discloses combining a maleic anhydride with a suitable vinyl monomer and a crosslinking agent in the presence of an inert solvent, such as methylene chloride, benzene or acetone to form a *lightly-crosslinked*, water-insoluble copolymer in gel form. (See e.g., Bashaw column 1 lines 59-66, and Bashaw column 3 line 49 through column 4 line 12.) The copolymer is then separated from the solvent and optionally dried, and is presented in finely divided or "chopped" fiber form. (See e.g., Bashaw column 2 lines 6-16, and Bashaw column 4 lines 11-21.)

During an interview with the Examiner held July 20, 2006, Applicants discussed the fact that such copolymer comprises hydrophobic carbon chains and hydrophilic carboxyl groups (and/or hydrophilic carboxylic acid groups). A conventional polymerization process, such as that utilized by Bashaw, tends to result in a copolymer having the hydrophilic carboxyl groups located on its surface. (See e.g., page 4 lines 9-13 of Applicant's disclosure.) Thus one of ordinary skill in the art would recognize that a copolymer made by this process would tend to be hydrophilic in nature. In addition, Applicants note that although Bashaw refers to the copolymer as being in "fiber" form, such fiber is arrived at through mechanical means via chopping. (See e.g., Bashaw column 4 lines

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16-21.) One of ordinary skill in the art would therefore also recognize that such "chopping" would have the effect of exposing additional hydrophilic groups located below the surface of the copolymer, thus further contributing to its hydrophilic nature.

Bashaw then mixes the copolymer with an aqueous surfactant solution, wherein the water in the aqueous solution can be absorbed, causing potential swelling of the copolymer. (See e.g., Bashaw column 2 lines 1-4.) It should be noted that the aqueous surfactant solution of Bashaw contains between 95% and 99.998% water. (Bashaw column 4 lines 43-45.) The mixture is then either placed directly into a papermaking furnish pulp slurry, or is dried first and then added to the pulp slurry. (See e.g., Bashaw column 2 lines 3-5.) Thus, an "essential" purpose of the surfactant is to disperse the lightly-crosslinked copolymer in the pulp slurry. (See e.g., Bashaw column 2 lines 6-16.) One of ordinary skill in the art would therefore recognize that Bashaw would desire a surfactant coating that is fugitive (i.e., releases from the copolymer) to change the surface tension of the pulp slurry, thus allowing the copolymer to disperse as required.

After being dispersed in the pulp slurry, the copolymer/cellulosic fiber mixture is dewatered and dried into a fibrous web. (See e.g., Bashaw column 4 lines 36-47.) The fibrous web containing cellulosic fiber and the lightly-crosslinked copolymer is then submitted to treatment with an alkaline agent to convert the carboxylic anhydride moieties of the copolymer into an ammonium or alkali metal salt form whereby the lightly cross-linked copolymer, while remaining water-insoluble, finally becomes *highly water-swellable*. (See e.g., Bashaw column 2 lines 47-53.)

In contrast to Bashaw, Applicants' invention is directed to a *superabsorbent material* that is water-insoluble and already highly water-swellable prior to any treatments. (See e.g., page 5 lines 27-30 of Applicants' disclosure.) Additionally, the superabsorbent material has a hydrophobic surface, rather than a hydrophilic surface such as described above. One example of a superabsorbent material having the hydrophobic properties of Applicants' invention is a superabsorbent fiber, such as made by the fiber spinning process disclosed in the present application. (See e.g., page 3 lines 13-14 of Applicants' disclosure.) During the interview held July 20, 2006, Applicants explained that the surfaces of the superabsorbent material become hydrophobic when the hydrophobic carbon chains within the material migrate to the surface during production, while the hydrophilic carboxyl groups and/or carboxylic acid groups migrate to the

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interior of the material. (See e.g., page 4 lines 9-22 of Applicants' disclosure.) The fiber spinning process is one such process in which this phenomenon occurs. (See page 4 lines 10-11 of Applicants' disclosure.) It should be noted that the superabsorbent material of the present invention is not later mechanically fractured or "chopped," such as discussed above, so that the carboxyl groups and/or carboxylic acid groups which have migrated to the interior of the material are not exposed in Applicants' invention. Therefore, the superabsorbent material of the present invention remains hydrophobic.

The hydrophobic superabsorbent material is then combined with a surfactant that has at least one functional group that is reactive with the hydrophobic superabsorbent surface, and one functional group that is non-reactive with the superabsorbent surface. (See e.g., page 5 lines 3-4 of Applicants' disclosure.) The surfactant is applied to the fiber in a liquid that is a solvent for the surfactant but not for the fiber. (See page 5 lines 7-8.) In addition, a small amount of water is added to the surfactant solution, but only in an amount that is sufficient to solvate (i.e., activate) the surface of the superabsorbent material, but not enough to cause significant swelling. (See e.g., page 5 lines 8-15.) For example, unlike the aqueous surfactant solution of Bashaw which has a water content of between 95% and 99.998%, the surfactant solution of Applicants' invention contains between only 0.5% and 30% water by weight of the solvent. (See e.g., Bashaw column 4 lines 42-47; See also page 7 lines 27-30 of Applicants' disclosure.) This allows the surfactant to permanently attach to the surface of the hydrophobic superabsorbent material, such as through bonding. Thus, in contrast to the discussion above, the surfactant of Applicants' invention is not fugitive, but rather is permanently attached to the superabsorbent material surface to render it permanently wettable. This is demonstrated in Table 1 of Applicants' disclosure, where a previously hydrophobic superabsorbent material that was then treated with a surfactant solution of the present invention, exhibited hydrophilic (i.e., wettable) properties, even after being washed six times. (See page 13, Table 1 Example 9 of Applicants' disclosure.)

Therefore, it can be seen that the teaching of Bashaw and Applicants' invention are significantly different. In addition to the contrasts described above, Bashaw is directed to a sorptive paper product which requires the use of cellulosic fibers to make the product work. In contrast,

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Applicants' invention is directed to a permanently wettable superabsorbent material which does not require the presence of cellulosic fibers.

Thus, each and every element as set forth in the claims of the present invention is not disclosed by Bashaw, as required by MPEP § 2131. In addition, as discussed above, (1) the processes used by Applicants and Bashaw are different, (2) the materials used by Applicants and Bashaw are different, and (3) the resulting products are different. Bashaw does not make clear that the missing descriptive matter is *necessarily* present in the thing described in the reference, nor would it be so recognized by persons of ordinary skill, as required by MPEP §2112. As was held in *In re Robertson*, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999), inherency may not be established by probabilities or possibilities, and the mere fact that a certain thing may result from a given set of circumstances is not sufficient. Therefore, neither the requirements of MPEP § 2131, nor the requirements of MPEP §2112, have been met. Applicants respectfully request that this rejection of claims 22-26, 27, 29-32, 34 and 35 under 35 U.S.C. § 102 be withdrawn.

In accordance with MPEP § 2142, a prima facie case of obviousness is established by meeting three criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure. *In re Vaeck*, 947 F.2d 4899 (Fed. Cir. 1991).

Applicants' invention is directed to making a permanently wettable superabsorbent material where a superabsorbent material having a hydrophobic surface is made permanently wettable by permanently attaching a surfactant to the surface. In contrast, as discussed above, one of ordinary skill in the art would recognize that Bashaw desires a surfactant that is fugitive such that it can promote dispersion of the copolymer within a cellulosic pulp slurry. The Examiner cites Howe as showing that cetyl dimethylamine oxide is an equivalent structure of lauryl dimehtylamine oxide. However, the teachings of Howe do not overcome the deficiencies of Bashaw, which were described in the previous section above. Thus, there would be no motivation by one of ordinary

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skill in the art to modify Bashaw or to combine Bashaw with Howe to arrive at Applicants' invention, as required by the first prong of the test of MPEP § 2142. With respect to the second prong of the test required by MPEP § 2142, there would not be a reasonable expectation of success in using the Bashaw reference, with or without the combination of Howe, to arrive at Applicants' invention. For example, as discussed above, Applicants submit that Bashaw teaches away from having a permanently attached surfactant. In addition, Bashaw requires cellulosic fibers in order to arrive at their sorptive paper product. In contrast, Applicants' invention is directed to a permanently wettable superabsorbent material and does not include cellulosic fibers. Numerous other contrasts between Bashaw and Applicants' invention are presented in the previous section above. Thus, at least the second prong of the test required by MPEP § 2142 has also not been met, and the combination of Howe with Bashaw does not overcome the deficiencies. It should be further noted that the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. For at least these reasons, a *prima facie* case of obviousness has not been established. Applicants respectfully request that this rejection of claims 22-26, 27, 29-32, 34 and 35 under 35 U.S.C. § 103 be withdrawn.

By way of the Office Action mailed March 21, 2006, the Examiner rejected claims 28, 33, 36 and 39 under 35 U.S.C. § 103 as allegedly being obvious to one of ordinary skill in the art at the time the invention was made and thus unpatentable over U.S. Patent Number 3,989,586 to Bashaw et al. ("Bashaw") in view of U.S. Patent Number 5,494,611 to Howe and in further view of U.S. Patent Number 6,217,890 to Paul et al. ("Paul"). This rejection is respectfully traversed to the extent that it may apply to the presently presented claims.

Claim 39 has been canceled.

In accordance with MPEP § 2142, the Examiner has the burden of establishing a *prima facie* case of obviousness by meeting three criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a

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reasonable expectation of success. Finally, the references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure. *In re Vaack*, 947 F.2d 4899 (Fed. Cir. 1991).

Bashaw and Howe have been discussed in the previous section above. Paul is directed to disposable absorbent articles that maintain or improve the wearer's skin health. (See e.g., Paul column 2 lines 51-54.) This is accomplished by the articles having a high air exchange rate when wet, maintaining skin temperature when wet, having reduced levels of skin hydration and the use of lotions to treat skin. (See e.g., Paul column 2 lines 54-58.) Paul discusses the use of high absorbency material in the article; however, Paul does not teach or disclose the superabsorbent material of Applicants' invention. (See e.g., Paul column 25 lines 14-64.) Thus, as discussed above in the previous section, as well as in the previous Response dated December 8, 2005, the addition of Paul in combination with Bashaw and Howe does not overcome the deficiencies to arrive at Applicants' invention. The requirements of MPEP § 2142 to establish obviousness have not been met, and Applicants respectfully request that the rejection of claims 28, 33, 36 and 39 under 35 U.S.C. § 103 be withdrawn.

Lastly, the Examiner's attention is drawn to a Request for Continued Examination in accordance with the provisions of 37 C.F.R. §1.114 which Applicants have filed contemporaneously herewith.

For the reasons stated above, it is respectfully submitted that all of the presently presented claims are in form for allowance. Applicants intend to be fully responsive to the outstanding Office Action. If the Examiner detects any issue which the Examiner believes Applicants have not addressed in this response, Applicants' undersigned attorney requests a telephone interview with the Examiner.

Applicants sincerely believe that this Patent Application is now in condition for allowance and, thus, respectfully request early allowance.

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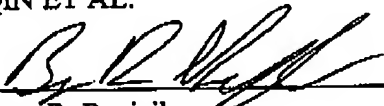
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The undersigned may be reached at: (920) 721-4405.

Respectfully submitted,

JIAN QIN ET AL.

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